

MEASURING THE EFFECT OF THE MODIFICATIONS OF LEGAL RULES IN CRIMINALITY TIME SERIES.*

by

MRS. KOVACSICS KATALIN NAGY

The development of criminality time series is influenced, as is known, not only by crime as a material factor but also by legislation as a s.c. formal factor. As such a formal factor appear the changes in the criminal substantive law and procedural law, and in many cases even the regulation pertaining to administrative infractions. In consequence of the s.c. formal factor one of the most delicate tasks of criminal statistics is the investigation of time series considering that even the not very long time seires do not contain homogeneous data. In general the traditional criminal statistics only presents these dissimilar data sets, indicating the breaking points of the time series and explaining the cause of the break, a change in the legal rule bringing about a significant decrease or increase in the series.

The aim of the investigation to be read below is to elaborate a measuring method which makes it possible to separate the two factors in the time series and measure the effect of the formal factors.

In the investigation I have used the time series of criminality for the years 1960–1978.

The period was selected upon the following considerations: Prior to the year of 1960 the criminal statistical data had been very scarce, since 1960 court statical data have been available, in 1964 the uniform criminal statistical data collection by the police and prosecution was established.

It seemed to be reasonable to terminate the investigation with the year 1978 for the time being because Act IV, 1978 on the Criminal Code came into effect on July 1, 1979, and thus its effect modifying the time series cannot be measured from the data of a few years. It seems to be expedient to continue the investigation when the data of the few years following the issue of the new Criminal Code have been published so that

* The investigation was commissioned by the Central Statistical Office. Herewith the author expresses her thanks to the Social-statistical main department for its help, in particular to Mrs Lévai for collecting court statistical data.

the effects of this legal rule of great importance can be evaluated statistically too.

In the first stage of the investigation the legal rules which could potentially influence the time series of the period had to be collected.

The collected legal rules contain the following legal sources:

- acts
- resolutions of Parliament law-decrees
- resolutions of the Presidential Council of the Hungarian People's Republic
- governmental regulations
- governmental decisions
- from among orders in council
- orders of the Minister of the Interior
- orders of the Minister of Justice

and in some cases the decisions of principle or guiding principles of the Highest Court.

In selecting the legal material it was a fundamental viewpoint to extend the scale of the legal rules to be collected even if all of them do not seem to influence the development of the time series, but it may occur in the course of a more intensive and detailed investigation that they play a role nevertheless in the development of the time series of a certain crime. Of course it would not have been proper to aim at completeness either. Thus the collection of the legal rules does not contain the legal material relating to administrative infractions except cases where the regulated acts dangerous to society may take the form of a crime or administrative infraction.

Nor does the collection cover the legal rules about the operation of the judicial organization, namely the rules about the dissolution or fusion of district courts or district attorney's departments, the activity of judicial experts, the election of judges, lay assessors, the appointment of prosecutors.

In the second stage of the investigation the time series of crimes included in the investigation had to be collected. The collection comprises about 60 crimes with relatively frequent occurrence from the data of court statistics for 1960–1978, so the existence of statistically measurable irregularities in the time series can be supposed.

For the same crimes I have collected the time series about the offenders of the uniform criminal statistics of the police-prosecution for 1965–1978. The use of these data is indispensable in the investigation of the formal factors since they are nearer to the time of the commission than those of the court statistics and so they react to the modifications of legal rules faster and with greater responsiveness.

The analysis of the time series took place with traditional statistical methods, namely with the help of basis rates, chain rates and graphic illustrations. With these methods it could be demonstrated where breaking

points, wave crests or wave troughs referring to formal changes appeared. To these critical points there are generally suitable legal rules which may cause a strikingly strong fluctuation of the time series. On many cases the analysis couldn't be done unequivocally because the time of the final judgement is moved away from the time of the commission. A thorough analysis was possible only by the aid of the shorter time series of the uniform criminal statistics of the police-prosecution.

In the course of the investigation of the time series it was ascertained that the effect of some formal factor could be felt in the time series of the following crimes or group of crimes:

1. Careless endangerment in occupation
2. Traffic offences
3. Customs and currency offences
4. Offences against property (both social and personal property)
5. Hooliganism

Particularly the following legal rules gave rise to overt deformation in the time series of the above-mentioned offences.

Act V, 1961 On the Criminal Code of the Hungarian People's Republic

Act I, 1968 On administrative infractions

Act I, 1973 On Criminal Procedure

Act IV, 1978 On the Criminal Code

Law-decree XIV, 1960 On making minor cases of some offences administrative infractions

Law-decree IV, 1963, On general amnesty

Law-decree XIII, 1964, On abolishing certain currency restrictions

Law-decree XX, 1964 On the modification of law-decree XVI, 1954 on the regulation of customs law

Law-decree II, 1966 On the regulation of the customs law

Law-decree 16, 1966 On the modification and completion of some criminal provisions

Law-decree VII, 1970 On exercising a general amnesty

Law-decree XXVIII, 1971 On the modification of the Act on the Criminal Code and administrative infractions

Law-decree XXIII, 1974 On the modification and completion of Act I, 1968 on administrative infractions

Law-decree VII, 1975 On a general amnesty

Governmental regulation 17, On some administrative infractions 1968 (14 IV)

Though the appearance of "formal factor" is presumable in other offences too, the frequency of occurrence of the offences is so small that solid consequences cannot be drawn. Such are from among the examined time series penal idleness and prostitution.

Finally, concerning a significant group of crimes — mainly the grave crimes — our legal policy is stabile, there are no formal changes. Such as e.g.

homicide
 violence against authorities
 bodily harm (light or grievous) and
 rape

Returning to the crimes enumerated in the first group have I used the following system so as to eliminate the formal factor from them.

Let $x_{60}, x_{61} \dots x_{78}$ indicate the examined years $y_{60}, y_{61} \dots y_{78}$ the correspondent data of the time series. Each subset of these data sets $x'_1, x'_2 \dots x'_j$, or $y'_1, y'_2 \dots y'_j$ are those years and data where the effect of formal factor doesn't appear, and the complementer subset is $x''_1, x''_2 \dots x''_k$ or $y''_1, y''_2 \dots y''_k$ where the distorting effect of the "formal factor" appears.

It is obvious that $j+k=19$ in the outlined investigation. Further on, I fitted a linear trend function to y values belonging to x points of time by using the least squares method.

I replaced y''_i value belonging to x''_i values with values interpolated by trend function, they are marked with η_i ($i=1, 2 \dots k$).

In order to measure the effect of the formal factor I figured out the difference $y_i - \eta_i$ for each critical year and compared their square mean to the square mean of η_i values.

$$\eta^2 = \sum_{i=1}^k \eta_i^2$$

$$H^2 = \sum_{i=1}^k (y''_i - \eta_i)^2$$

$$K = \frac{\sqrt{\frac{\sum_{i=1}^k (y''_i - \eta_i)^2}{k}}}{\sqrt{\frac{\sum_{i=1}^k \eta_i^2}{k}}} = \frac{H}{\eta}$$

The result of calculation multiplied by 100 gave the measure of distortion in percentage.

In the application of the method the time series of the following crimes proved to be particularly interesting:

Careless endangerment in occupation
 driving under the influence of drink
 customs offences
 currency offences
 embezzlement impairing the social property
 fraud impairing the social property
 hooliganism

In order to demonstrate the method I am going to present the two kinds of time series of fraud impairing the social property (CC § 293) and the method for correcting them (table 1 and 2).

Table 1

The time series of offenders committing fraud impairing the social property (CC § 293)
(rates and fitting of trend)

Year (X_i)	Number of offenders (Y_i)	Basis rates (1965 = = 100%)	Chain rates	$x_i = X_i - \bar{X}$	$y_i = Y_i - \bar{Y}$	Trend values η_i	$H_i = Y_i - \eta_i$
1965*	2028	100,0	—	—	—	1710	318
1966*	2241	110,5	110,5	—	—	1696	545
1967	1850	91,2	82,6	-6	251,7	1682	—
1968*	1235	60,9	66,8	—	—	1668	-433
1969	1546	76,2	125,2	-4	-52,3	1654	—
1970*	832	41,0	53,0	—	—	1640	-808
1971	1256	61,9	151,0	-2	-342,3	1626	—
1972	1751	86,3	139,4	-1	-152,7	1612	—
1973	1822	89,8	104,1	0	223,7	1598	—
1974	1586	78,2	87,0	1	-12,3	1584	—
1975*	1321	65,1	83,3	—	—	1570	-249
1976	1510	74,5	114,3	3	-88,3	1556	—
1977	1482	73,1	98,1	4	-116,3	1542	—
1978	1582	78,0	106,7	5	-16,3	1528	—

* Unheeded years

$\bar{X} = 1973$

$\bar{Y} = 1958,3$

$\Sigma x_i^2 = 108$

$\Sigma x_i y_i = 1516,7$

$b = 14,0$

$\eta^2 = \Sigma \eta_i^2 = 13\,737\,240$

$H^2 = \Sigma (Y_i - \eta_i)^2 = 1\,199\,379$

$K = \frac{H}{\eta} = 29,5\%$

$\eta = 3706,38$

$H = 1095,16$

Formal changes in offences against property were called forth by Act V, 1961 on the Criminal Code of the Hungarian People's Republic, Act I. 1968 on administrative infractions of limits of values, and provisions of 1970 and 1975 on the General Amnesty. As in each offence against property the same irregularities can regularly be observed, the figures show only the time series of fraud and embezzlement impairing the social property. (fig. 1 and 2). In each table the years marked with */ mean the unheeded years in the calculation of trend because of the formal change.

Table 2

The time series of offenders validly convicted for fraud impairing the social property
(CC § 293) (rates and fitting of trend)

Year (X_i)	Number of validly convicted offenders (Y_i)	Basis rates (1965 = 100%)	Chain rates	$x_i = X_i - \bar{X}$	$y_i = Y_i - \bar{Y}$	Trend values η_i	$H_i = Y_i - \eta_i$
1960	1344	123,0	—	-9,25	172	1382	—
1961	1522	139,2	113,2	-8,25	350	1358	—
1962	1507	137,9	99,0	-7,25	335	1334	—
1963*	621	56,8	41,2	—	—	1310	-689
1964*	799	73,1	128,7	—	—	1286	-487
1965	1093	100,0	136,8	-4,25	-79	1262	—
1966	1277	116,8	116,8	-3,25	105	1238	—
1967	1264	115,6	99,0	-2,25	92	1214	—
1968*	1014	92,8	80,2	—	—	1190	-176
1969*	797	72,9	78,6	—	—	1166	-369
1970*	452	41,4	56,7	—	—	1142	-690
1971*	575	52,6	127,2	—	—	1118	-543
1972	731	66,9	127,1	2,75	-441	1094	—
1973	926	84,7	126,3	3,75	-246	1070	—
1974	1126	103,0	121,6	4,75	-46	1046	—
1975*	923	84,4	82,0	—	—	1022	-99
1976	1039	95,1	112,6	6,75	-133	998	—
1977	1042	95,3	100,3	7,75	-130	947	—
1978	1193	109,1	114,5	8,75	21	950	—

* Unheeded years

$$\bar{X} = 1969,25$$

$$\bar{Y} = 1172$$

$$\sum x_i^2 = -466,25$$

$$\sum x_i y_i = -11 795$$

$$b = -24,0$$

$$\eta_i^2 = \sum y_i^2 = 9 744 124$$

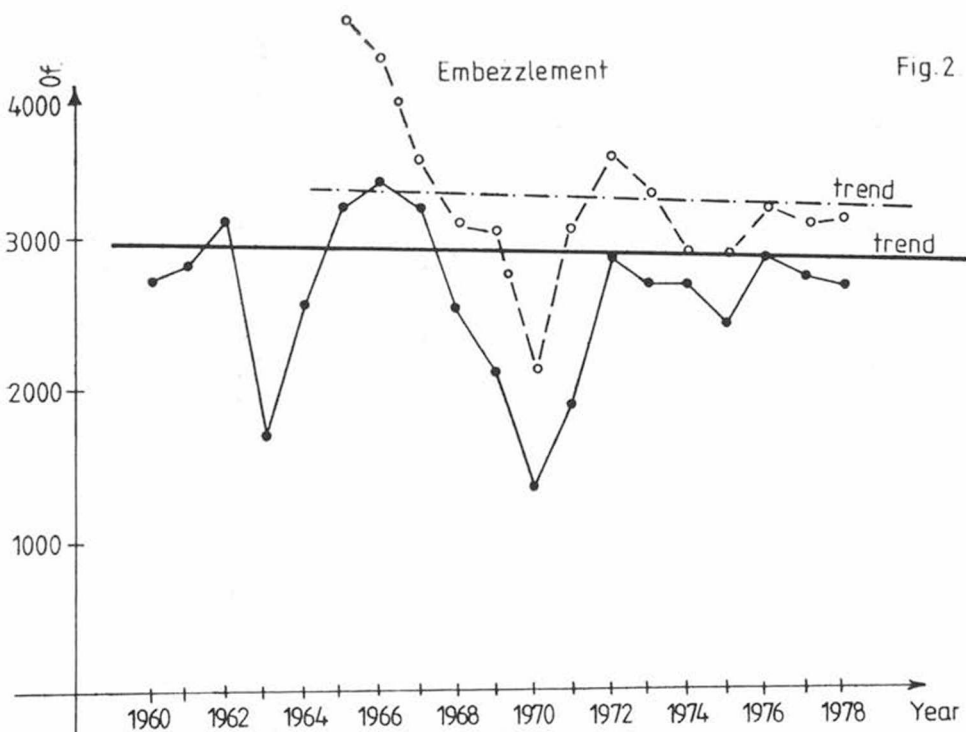
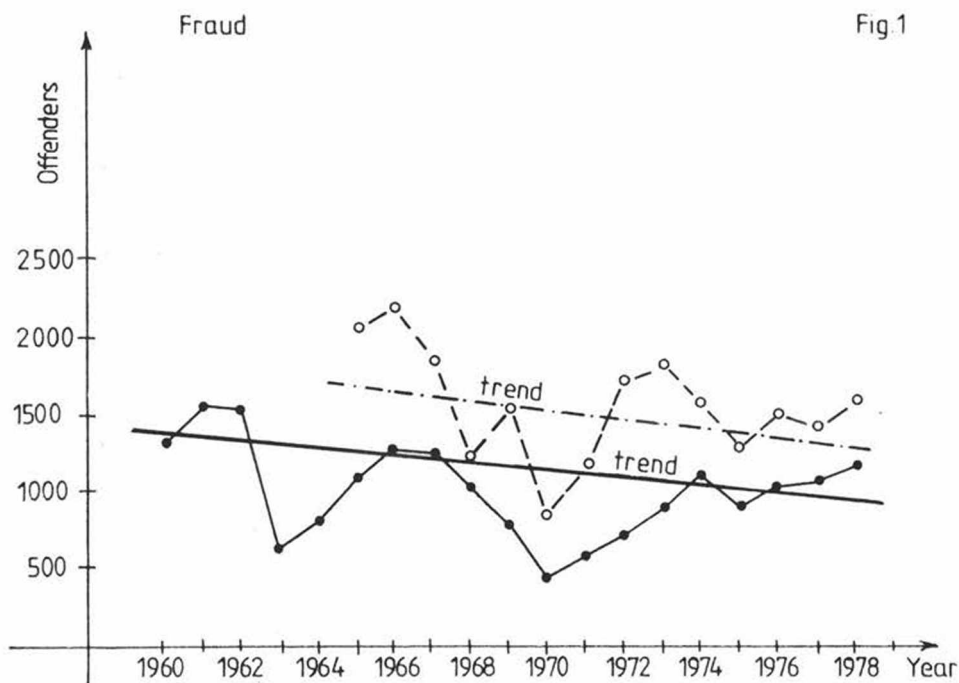
$$H^2 = \sum (Y_i - \eta_i)^2 = 1 659 777$$

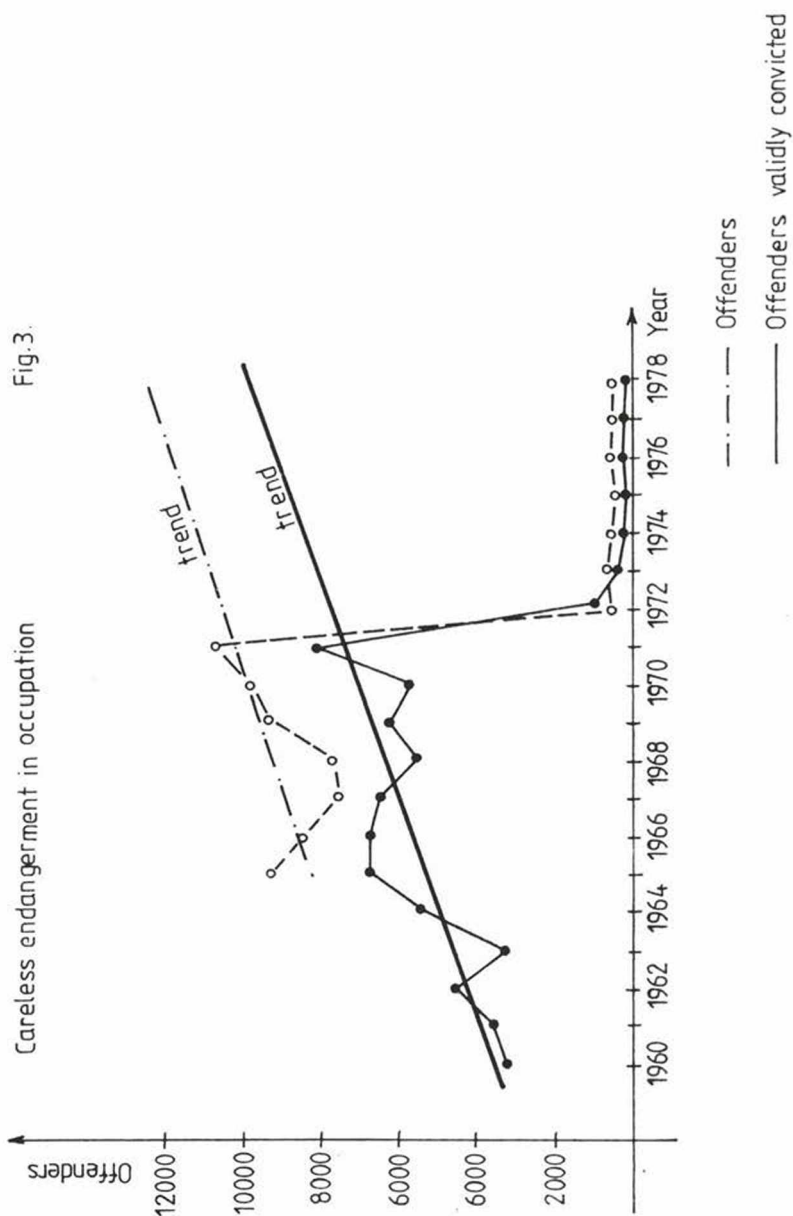
$$\eta = 3121,56$$

$$H = 1288,32$$

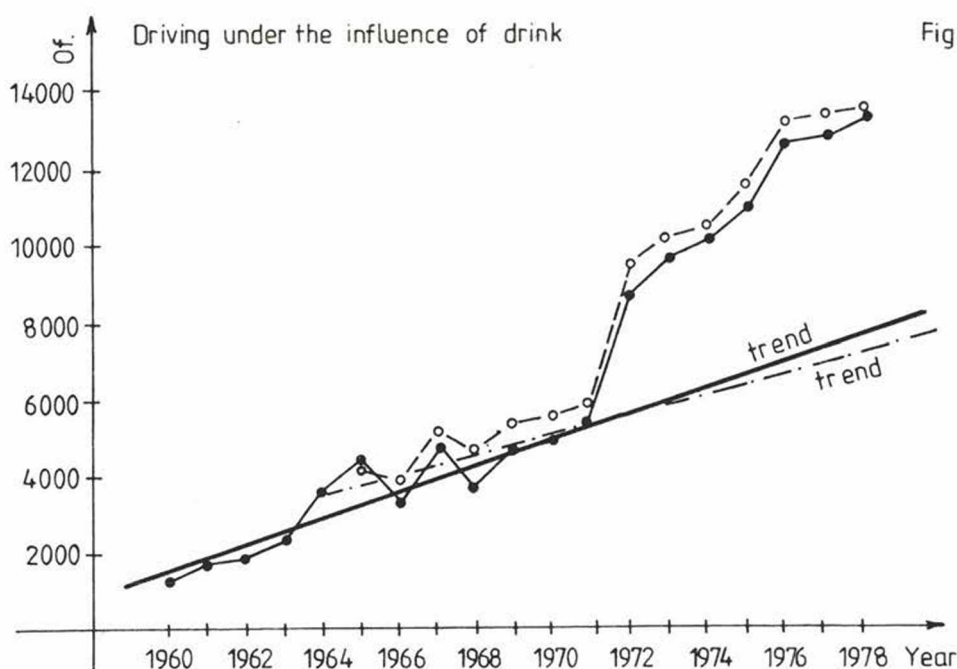
$$K = \frac{H}{\eta} = 41,3\%$$

I examined the careless endangerment in occupation in a contracted time series-not emphasizing the cases causing death or grievous bodily harm-with regard to the small number of cases and to the fact that data about the offenders were accessible for me in contracted form only. In this group of crimes law-decree XXVIII, 1971 brought a formal change, emphasizing and determining traffic offences as independent facts of a crime. In the trend calculation I took into consideration the data till 1971 and did extrapolation for the period after 1972. (fig. 3).

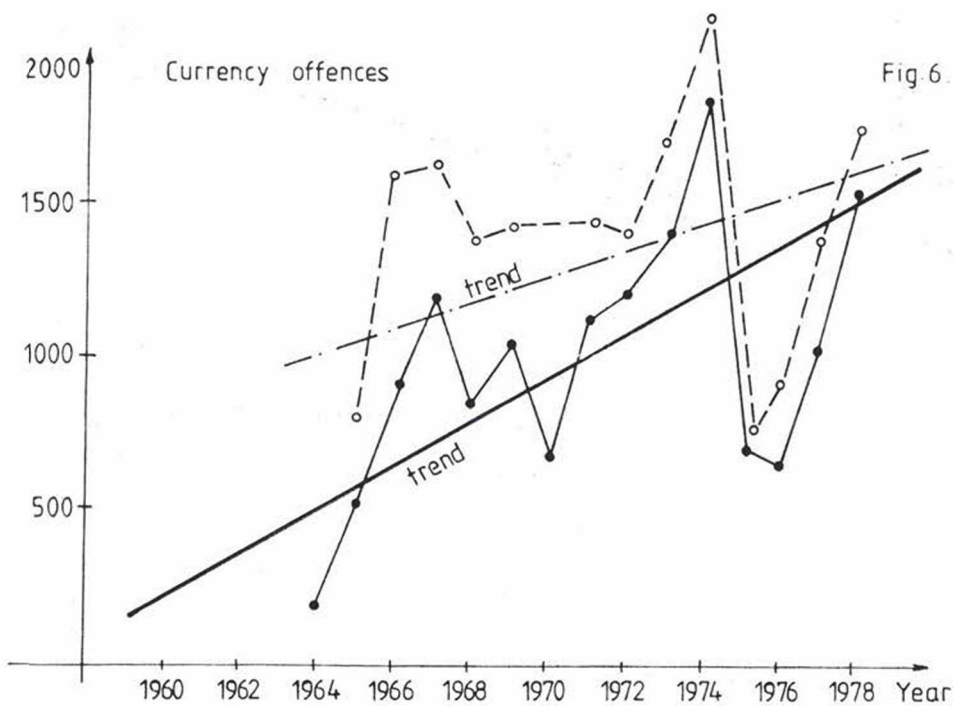
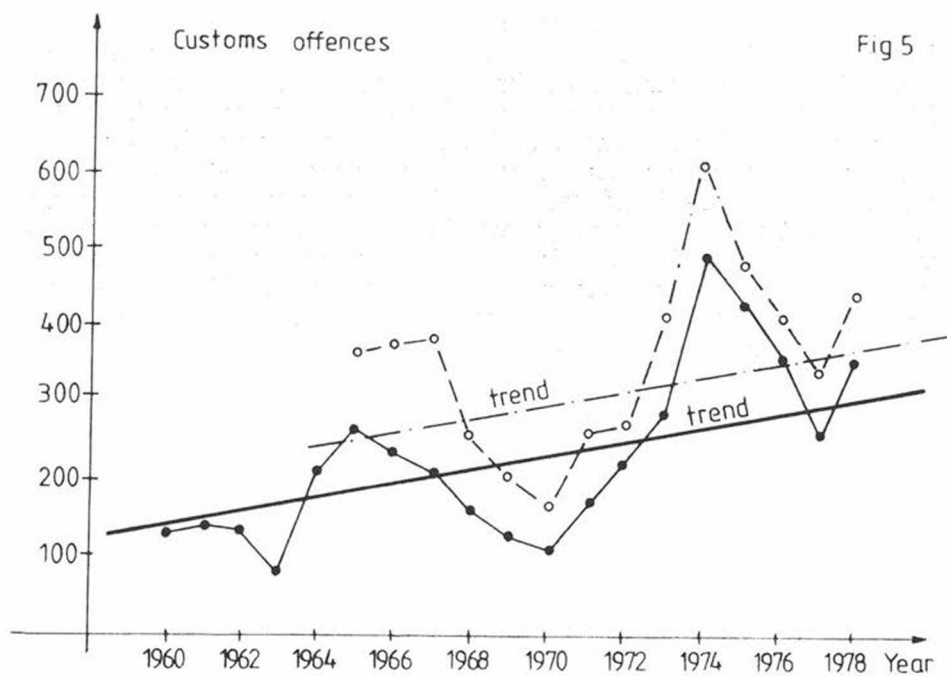




In the traffic offences I laid stress on driving under the influence of drink (§ 194), there law-decree XXVIII, 1971 brought an essential formal change, extending the offence to cyclists and carters too from 1971 to 1972 the amendment of the Criminal Code resulted in 59.7% increase of the offenders and a 54.6% increase of the validly convicted offenders. In this time series I regarded the years till 1971 as x_i' values and extrapolated the trend calculated from the previous years for the values of 1972 and the following years (fig. 4). From the customs and currency offences the effect of a lot of formal factors had to be screened. There were no data available in court time series for 1960–63 because offences against currency were observed together with counterfeiting and customs offences with tax offences.



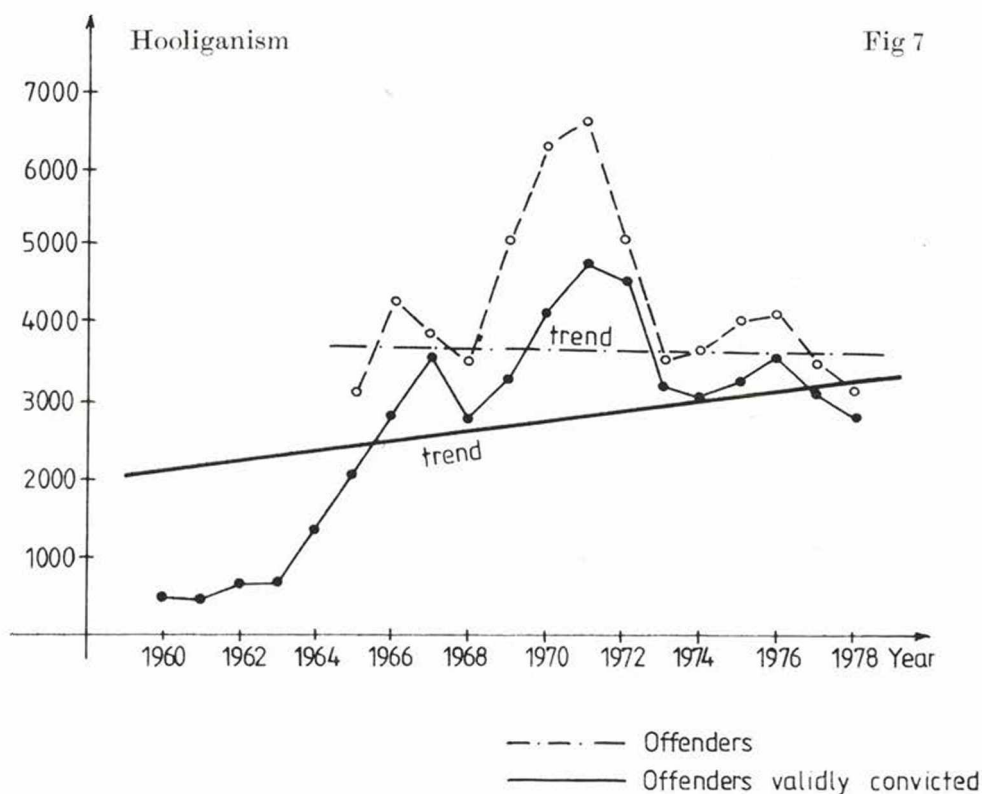
Law-decree II, 1966 on the Regulation of customs law, law-decree I, 1968 on Administrative infractions (raising the limit of value of the break of the customs act to 5000 Forints and that of the infraction of currency regulations to 1000 Forints), law-decree XXIII, 1974 on the modification and completion of Act I, 1968 on Administrative infractions/raising the limit of value of the break of the customs act to 1000 Forints that of the infringement of currency regulations to 3000 Forints essentially influenced the formation of the time series before the above-mentioned legal rules came into effect in 1966–68 a slow, in 1972–74 a rapid increase, following it a rapid decrease could be observed.

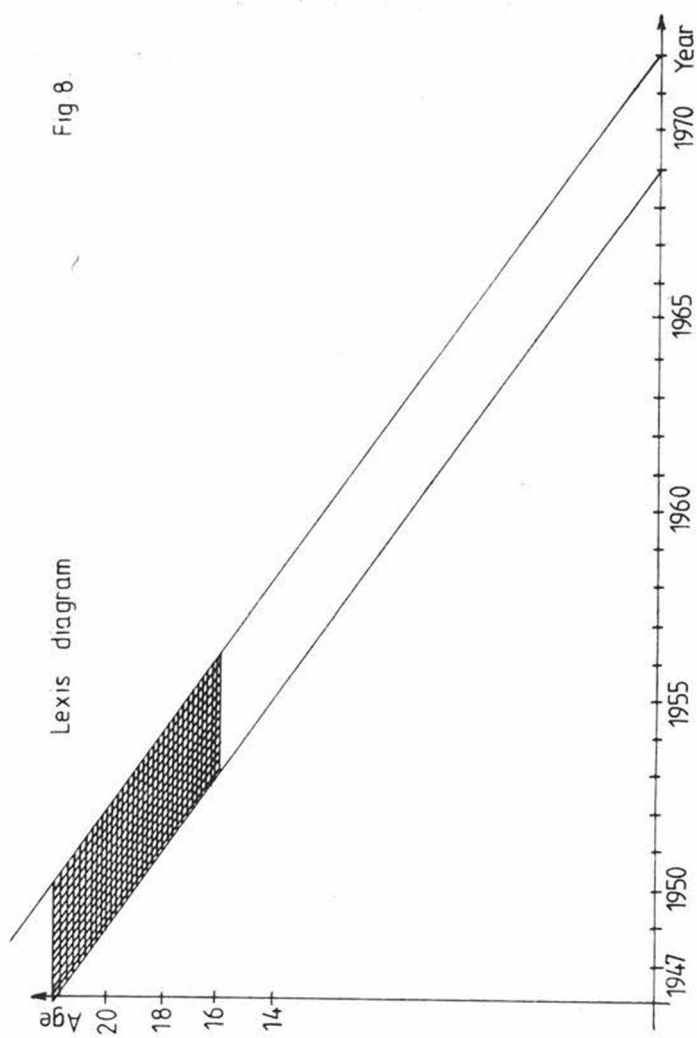


Besides the regulation of the customs and currency laws these time series are affected by more general formal factors too, such as the legal rules in the general amnesty of 1970–75 (law-decree VII, 1970.) On exercising a general amnesty and law-decree VII, 1975 on a general amnesty.)

Taking all this into consideration I fitted the trend of currency offences on the basis of the data of the years 1964, 65, 69, 71, 72, 77, 78 and the trend of customs offences on the basis of the data of 1964, 65, 69, 71, 72, 73 and 78. I reckoned the data of the intermediate years with trendinterpolation. (fig. 5–6).

Concerning hooliganism data of two irregular periods had to be corrected with trend calculation. One of them is explained by the legal rule on making minor cases of certain crimes administrative infractions (law-decree XIV, 1960); between 1960–63 the occurrence of hooliganism as offences was extremely low. The other period was between 1969–72, in these years hooliganism was, in turn, extremely high (fig. 7). These high values cannot be explained with any modification of legal rules. In explaining this phenomenon it must be taken into consideration that





between 1969–1972 offenders of 16–22 years were born between 1947 and 1956, when the birth rate is known to have been very high. (The birth rate between 1947–1955 fluctuated between 20 and 23 per cent. The connection between age, year of birth and the year of the commission can be read from the Lexis diagram (fig. 8).

On the other hand, among these committing hooliganism the age-group of 16–22 has a very high age specific rate, accordingly it is presumable that the high rate of hooliganism of the unheeded 4 years (1962–72) can be explained with demographic wave.

Summarizing the results of the investigation I am going to present K values of the index defined for measuring the effect of the formal factor on some studied crimes.

Table 3

Crime	Uniform data of the police-prosecu- tion criminal statistics	Court Statistics
Careless endangerment in occupation	90,6	95,2
Driving under the influence of drink	74,5	69,2
Customs offences	44,7	46,1
Currency offences	43,9	41,8
Embezzlement of social property	27,1	32,3
Fraud with social property	29,5	41,3
Hooliganism	58,9	60,4

From the presented method two lessons can be drawn:

1. No formal changes distorting the criminality time series may raise insurmountable difficulties for the analyst-statistician: the statistical method makes it possible to correct the distortions caused by the formal changes:

2. Before modifying the legal rules it would be expedient to make preliminary measuring or prognoses about their result to be expected. E.g. if the value limit of crimes impairing property is raised it took place on two occasions during the investigated period- it would be proper to collect the data broken down according to the new limit of value too 1–2 years prior to their coming into effect. This would help bring about conform time series after the modification.

If the numerical effect of the modification of the legal rule could be foreseen by the legislator, it would allow of avoiding such a modification of the legal rule which has to be modified again within a short time after its coming into force (e.g. the extension of shoplifting in a supermarket, driving under the influence of drink, and so on.

MESSUNG DER WIRKUNG DER RECHTSNORMÄNDERUNGEN IN DEN ZEITREIHEN DER KRIMINALITÄT

DR. KOVACSICSNÉ NAGY KATALIN

(Zusammenfassung)

Wie bekannt, wird die Gestaltung der Kriminalitätsreihen nicht nur durch die Kriminalität, als materiellen Faktor sondern auch durch die Rechtsnormenschaffung, als sogenannten formalen Faktor bedeutend beeinflusst. Als formelle Faktoren wirken die Änderungen im Strafrecht und Strafprozeßrecht, aber in vielen Fällen auch die Regelung der Übertretungen. Infolge des sogenannten formellen Faktors ist eine der wichtigsten Aufgaben der Kriminalstatistik die Untersuchung der Zeitreihen mit Rücksicht darauf, daß nicht einmal die nicht zu langen Zeitreihen keine homogenen Angaben enthalten. Die traditionelle Kriminalstatistik ist im allgemeinen mit der Vorlegung dieser inhomogenen Datenreihen zufrieden, bezeichnet die Bruchstellen der Zeitreihen, und erklärt die Ursachen des Bruches und erwähnt die Rechtsnormänderungen, die in der Reihenfolge einen bedeutenden Rückgang oder Zunahme verursacht haben.

Die Abhandlung präsentiert uns eine Messungsmethode, wodurch die Absonderung der in den Zeitreihen wirkenden zwei Faktoren ermöglicht wird.

Die Angaben der ungarischen Kriminalstatistiken der Jahre zwischen 1960–78 untersuchend, stellt die Verfasserin fest, daß in den Zeitreihen folgender Straftaten bzw. Straftatengruppen solche formellen Änderungen zu beobachten sind:

1. Die verschuldete Gefährdung im Bereich des Berufs
2. Verkehrsdelikte
3. Zoll- und Devisendelikte
4. Eigentumsdelikte (sowohl zum Schaden des gesellschaftlichen, als auch des persönlichen Eigentums)
5. Rowdytum

Bei einer bedeutenden Gruppe der Straftaten ist unsere Rechtspolitik stabil, es gibt keine formellen Änderungen z. B.

- bei der Tötung
- der körperlichen Verletzung
- der Notzucht

Zur Beseitigung der formellen Faktoren werden von der Verfasserin folgende Methoden angewandt: die durch den formellen Faktor entstellten Angaben läßt sie aus der Zeitreihe aus, an die zurückbleibende Zeitreihe fügt sie eine Linearfunktion und ergänzt mit deren Werten die weggelassenen Angaben. Die Streuung der zweierlei Werte mit der Streuung der gewonnenen Werte verglichen gewinnt sie zur Messung der Wirkung des formellen Faktors einen Index (K). Die Werte von K beim untersuchten Verbrechen enthält die Tabelle 3.

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MRS. KOVACSICS KATALIN NAGY

(Summary)

The development of criminality time series is influenced, as is known, not only by crime as a material factor but also by legislation as a s. c. formal factor. As such a formal factor appear the changes in the criminal substantive law and procedural law and in many cases even the regulation pertaining to administrative fractions. In consequence of the s. c. formal factor one of the most delicate tasks of criminal statistics is the investigation of time series considering that even the not very long time series do not contain homogeneous data. In general the traditional criminal statistics only presents these dissimilar data sets, indicating the breaking points of the time series and explaining the cause of the break, a change in the legal rule bringing about a significant decrease or increase in the series.

The study presents a measuring method which makes it possible to separate the two factors in the time series.

Having examined the data of the Hungarian criminal statistics for 1960–1978 the author establishes that such formal changes can be observed in the time series of the following crimes or groups of crimes:

1. Careless endangerment in occupation
2. Traffic offences
3. Customs and currency offences
4. Offences against property/both social and personal property)
5. Hooliganism

Concerning a significant group of crimes our legal policy is stabile, there are no formal changes. Such as e. g.:

homicide
bodily harm
rape

In order to eliminate the formal factor the author applies the following method: she omits the values deformed by the formal factor from the time series, fits a linear trendfunction to the remaining time series and replaces the omitted values with its values. Comparing the dispersion of the deviations of the two values to the dispersion of the values obtained in this way she gets an index (K) to measure the effect of the formal factor.

K values for the investigated crimes are indicated in table 3.